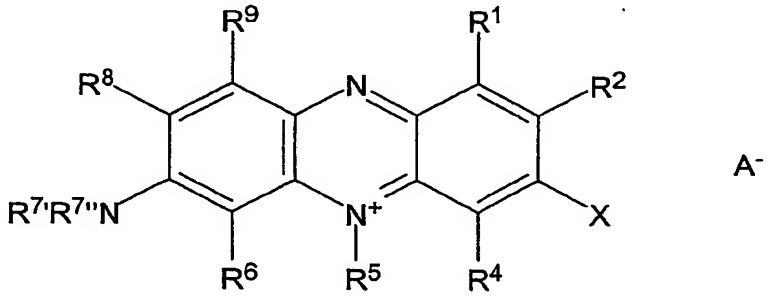
Claims:

1. Halogenated or pseudohalogenated monomeric phenazinium compounds of a purity of at least 85 mole-% having the following general chemical formula:



I

wherein

R^1, R^2, R^4, R^6, $R^{7'}$, $R^{7''}$, R^8 and R^9 are selected independently of each other from a group comprising hydrogen, halogen, amino, aminoalkyl, hydroxy, cyano, thiocyanate, isothiocyanate, cyanate, isocyanate, mercapto, carboxy, the salt thereof, carbonic acid ester, sulfo, the salt thereof, sulfoester, lower alkyl, unsubstituted aryl, substituted aryl, heteroaryl and alicyclic heteroradicals,

R^5 is selected from a group comprising lower alkyl, unsubstituted aryl, substituted aryl and heteroaryl,

X is a halogen or a pseudohalogen and

A^- is an acid anion.

2. The phenazinium compounds according to claim 1, characterized in that R^1, R^2, R^4, R^6, $R^{7'}$, $R^{7''}$, R^8 and R^9 are selected independently of each other from a group comprising hydrogen and lower alkyl.

3. The phenazinium compounds according to claim 2, characterized in that lower alkyl is methyl or ethyl.

4. The phenazinium compounds according to any one of the preceding claims, characterized in that R^5 is aryl.

5. The phenazinium compounds according to claim 4, characterized in that aryl is phenyl.

6. The phenazinium compounds according to any one of the preceding claims, characterized in that X is chlorine, bromine or thiocyanate.

7. The phenazinium compounds according to any one of the preceding claims, characterized in that they are selected from a group comprising

i) 3-chloro-7-N,N-dimethylamino-2-methyl-5-phenyl-phenazinium salt,
ii) 3-bromo-7-N,N-dimethylamino-2-methyl-5-phenyl-phenazinium salt,
iii) 3-bromo-7-N,N-diethylamino-5-phenyl-phenazinium salt and
iv) 7-amino-2,8-dimethyl-3-thiocyanato-5-phenyl-phenazinium salt.

8. The phenazinium compounds according to claim 7, characterized in that the salt is selected from a group comprising chloride, bromide, hydrogen sulfate and tetrafluoroborate.

9. The phenazinium compounds according to any one of claims 7 and 8, characterized in that they are selected from a group comprising

i) 3-chloro-7-N,N-dimethylamino-2-methyl-5-phenyl-phenazinium chloride,
ii) 3-bromo-7-N,N-dimethylamino-2-methyl-5-phenyl-phenazinium bromide,
iii) 3-bromo-7-N,N-diethylamino-5-phenyl-phenazinium bromide and
iv) 7-amino-2,8-dimethyl-3-thiocyanato-5-phenyl-phenazinium tetrafluoroborate.

10. The phenazinium compounds according to any one of the preceding claims, obtainable according to the following method:

a) forming a diazonium compound by diazotization of a monomeric phenazinium compound comprising at least one primary amino group in the presence of mineral acid and diazotization means in a first reaction step,
b) reacting the diazonium compound in a second reaction step to the halogenated or pseudohalogenated monomeric phenazinium compound in the presence of mineral acid and halide or pseudohalide,

wherein the first and the second reaction steps are both run in one single vessel.

11. A method of preparing the halogenated or pseudohalogenated monomeric phenazinium compounds in accordance with one of claims 1 – 10, comprising the following reaction steps:

a) forming a diazonium compound by diazotization of a monomeric phenazinium compound comprising at least one primary amino group in the presence of mineral acid and diazotization means in a first reaction step,
b) reacting the diazonium compound in a second reaction step to the halogenated or pseudohalogenated monomeric phenazinium compound in the presence of mineral acid and halide or pseudohalide,

characterized in that the first and the second reaction steps are both run in one single vessel.

12. The method according to claim 11, characterized in that the mineral acid is selected from a group comprising hydrogen halides, sulfuric acid, tetrafluoroboric acid, hexafluorophosphoric acid, phosphoric acid and the mixtures thereof with the proviso that no hydrogen halide is used in the preparation of the pseudohalogenated monomeric phenazinium compounds.

13. The method according to any one of claims 11 and 12, characterized in that the diazotization means is metal nitrite or nitrosylsulfuric acid.

14. The method according to claim 13, characterized in that the metal nitrite is sodium nitrite.

15. The method according to any one of claims 11 – 14, characterized in that the halide is added in the form of hydrogen halide and/or in the form of a metal halide.

16. The method according to claim 15, characterized in that the metal halide is selected from a group comprising transition metal halides.

17. The method according to claim 16, characterized in that the transition metal halides are selected from a group comprising copper(I) halides, copper(II) halides, nickel(II) halides and iron(II) halides.

18. The method according to any one of claims 11 – 17, characterized in that the halide is selected from a group comprising fluoride, chloride and bromide.

19. The method according to any one of claims 11 – 17, characterized in that the pseudohalide is selected from a group comprising cyanate (–OCN), thiocyanate (–SCN), isocyanate (–NCO) and isothiocyanate (–NCS).

20. The method according to any one of claims 11 – 19, comprising the following method steps:

i) mixing the monomeric phenazinium compounds, comprising at least one primary amino group, with the mineral acid,
ii) next heating to a temperature above room temperature,
iii) adding the halide or pseudohalide
iv) adding the diazotization means.

21. The method according to claim 20, characterized in that, in the preparation of the halogenated monomeric phenazinium compounds, the mineral acid is hydrogen halide and step iii) is eliminated.

22. The method according to any one of claims 11 – 21, characterized in that the following halogenated or pseudohalogenated monomeric phenazinium compounds are prepared:

a) 3-chloro-7-N,N-dimethylamino-2-methyl-5-phenyl-phenazinium chloride,
b) 3-bromo-7-N,N-dimethylamino-2-methyl-5-phenyl-phenazinium bromide,
c) 3-bromo-7-N,N-diethylamino-5-phenyl-phenazinium bromide,
d) 7-amino-2,8-dimethyl-3-thiocyanato-5-phenyl-phenazinium tetrafllluoroborate.

23. An acidic bath for electrolytically depositing a copper deposit, containing at least one halogenated or pseudohalogenated monomeric phenazinium compound in accordance with any one of claims 1 – 10.

24. The bath according to claim 23, characterized in that the phenazinium compounds are contained in a concentration of from 0.00005 – 0.1 g/l.

25. The bath according to one any of claims 23 and 24, characterized in that it additionally contains compounds selected from a group comprising nitrogen-containing sulfur compounds and polymeric nitrogen compounds.

26. The bath according to claim 25, characterized in that the concentration of the nitrogen-containing sulfur compounds and the polymeric nitrogen compounds contained together in the bath is from 0.0001 – 0.50 g/l.

27. Use of the bath according to any one of claims 23 – 26 for depositing a mirror bright, leveled copper deposit for the purpose of producing decorative surfaces.

28. Use of the bath according to any one of claims 23 – 26 for forming a copper deposit on printed circuit board material.

29. Use of the bath according to any one of claims 23 – 26 for forming a copper deposit on semiconductor substrates.

30. A method of electrolytically depositing a copper deposit onto a workpiece by which the workpiece and at least one anode are contacted with the bath according to one of claims 23 – 26, and a flow of electric current is generated between the workpiece and the anodes.